Complete the following worksheet using the Nuclear Energy Power Point.
[Page #s in the PPT are indicated to the right of each question]

1) Distinguish between chemistry and physics in regard to which part of the atom is stressed. [pp 3-4]

2) The nucleus is made up of _____ and _____ (nuclear particles). [p 5]

3) Isotopes contain the same number of _____ but a different number of _____. [p 6]

4) Give two isotopes of the helium atom using symbols and numbers. Label the atomic number and mass for both isotopes in the appropriate places. [pp 6 - 7]

5) Circle the properties that are **different** between two isotopes of the same element: [pp 6-8]

a. mass b. chemical properties c. # of protons d. # of neutrons e. # of electrons

6) How many protons are in $_{6}C^{14}$? _____ How many neutrons? _____ [pp 8]

7) How radioactive is a gram of carbon in a living plant? _____beta emissions/minute [p 9]

8) What is the half-life of Carbon 14 _____ years? How long would it take for a sample to drop to one half of its present amount? _____ years One quarter of its present amount? _____ years One eighth of its present amount? _____ years [pp 12 - 13]

9) If our body contains 400 grams of Carbon 14, how many years would it take to only have 25 grams (TIPS?) [p 14]

10) Complete the table below showing nuclear radiation particles. [p 16-18]

Type of Radiation	Name of Particle	Travel Range	Outside Forces

11) What type of radiation is given off by radium and radon as it transmutates into lead? [p 19]

12) What famous scientist discovered radium and won the Noble Peace Prize in Physics? Where did she find the radium? [p 20]

13) What happens when alpha particles come near positively charged particles? When they come near negatively charged particles? [p 21]

14) What potentially harmful element accumulates in house basements as a result of radium decaying? [pp 22 - 24]

15) What is the term used for nuclear particles which possess only the nucleus of the atom without its electrons? [pp 26 - 28]

16) Compare the amount of energy released in a nuclear reaction to a chemical reaction. [p 31]

17) What does each symbol in the equation: $E = mc^2$ represent ("m" is not simply "mass")? [pp 32-35]

E →
m →
c →

18) Write the symbols and names for the two isotopes that work well to produce energy by nuclear fission? [p 39]

a. b.

19) In order to split the Uranium 235 nucleus (fission), a _____ bombards it and begins a _____ reaction. [pp 40 - 41]

20) To keep the neutrons from just bouncing off the Uranium 235 nucleus, a _____ is used to slow down the neutrons before they make impact. [p 42]

21) American nuclear power reactors use _____ as a moderator. The Chernobyl reactor in Russia used _____ as a moderator, which led to disaster. [p 43]

22) Name three important components of electricity production using nuclear fission. [pp 44 - 45]

a. b. c.

23) _____ can be used as a moderator, coolant and storage material for nuclear fuel rods. [p 47]

24) Only ____% of Uranium on earth is U^{235}. It takes _____% of U^{235} to make a nuclear reactor produce nuclear fission. It would take ____% to make a nuclear bomb. [p 50]

24) A "breeder" reactor can "enrich" abundant U^{238} into _____, a highly fissionable isotope often used to make nuclear weapons. [pp 52 - 55]

25) Presently nuclear _____ is stored temporarily on-site, but may eventually be permanently stored at a facility like _____ mountain in Nevada. [pp 56 – 58]